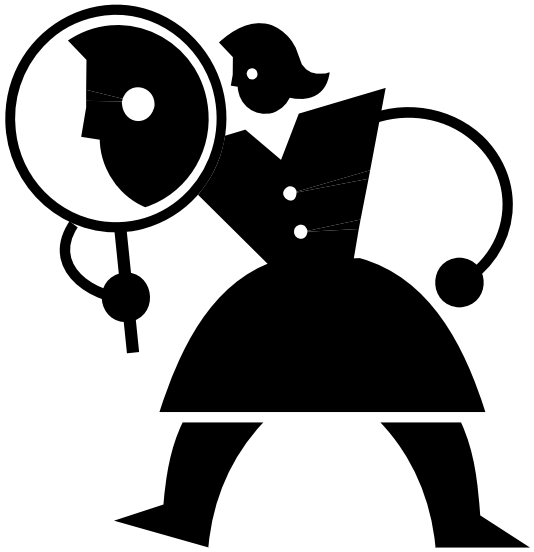
BEGINNING SCHOOL BUS DRIVER CURRICULUM



UNIT II
VEHICLE FAMILIARIZATION

Revised 07/2008

MICHIGAN Department of Education

BUS DRIVING WOES

Have you ever tried driving a school bus
With umpteen kids all creating a fuss?
It sure is exciting and at times very trying
To have to put up with the yelling and crying

So start your bus after checking it out
And say a prayer as you start your route
You stop at the school to pick up your load
Then it's off you go and down the road

You've gone less than a mile a noise you hear
Keep one eye on the road and one on the mirror
Of course you know the noise, you've heard it before
Joey tried to open the emergency door!

Keep your eyes on the road as there's bicyclists ahead
Then squish you get an orange on the back of your head
Look up quick to try to catch the jerk
Fifty kids all smiling a silly little smirk.

Then somewhere in back two kids start a fight
And others start screaming with all their might
Quick stop the bus if you can find a place
Before someone ends up with a bloody face.

Kids block the aisle, they don't want it stopped
At least until someone really gets popped.
You pull them apart and ask who started this mess,
The other one did, they both confess.

Back on the road everything's quieted down
Till big ole Albert starts acting like a clown.

Flipping over a seat he creates a flap
As he lands in shy little Mary's lap.

She screams so loud you can't help but look
Just in time to see him get whopped with her book.
Back in his seat with no serious harm done
Today those brats are really having fun.

As they start getting *off*, one by one
You wonder if this day will ever get done.
You could call parents but what good would it do
Their children are all angels, through and through.

There's a car pulling out, quick hit the brake
He saw you coming, it was no mistake.
That yo-yo didn't want to get behind a bus,
Let's hope the kids didn't hear you cuss.

Five more kids and day will be through
Then you can go home to a well-deserved brew.
You stop the bus with the flashers going
And some nut goes past without even slowing.

You finally come to the last stop and open the door
He stops by you as you warily wonder what for
Then says you're the best driver he's ever had
Maybe, just maybe, these kids are not all bad.

By a Bus-driving Poet – Mary Reaurne
Jefferson School Bus Driver

VEHICLE FAMILIARIZATION

TABLE OF CONTENTS

OBJECTIVES

- The driver will state the legal description of a school bus and commercial motor vehicle.
- The driver will identify the physical characteristics of a bus and describe the problems caused by these characteristics.
- The driver will identify the danger zones around the vehicle.

VEHICLE FAMILIARIZATION

1. What is a School Bus?

2. What is a Multifunction School Activity Bus?

3. What is a Commercial Motor Vehicle?

4. Bus Configuration -- Weights and Measurements

5. Bus/Car Comparisons

6. Investigating Blind Spots

7. Mirror Standards

8. Measuring the School Bus

A school bus is vastly different from the automobile drivers are accustomed to driving. These differences can cause serious problems if drivers are not aware of them and the effect they have on vehicle operation.

This unit will familiarize drivers with a school bus and make them aware of some of the associated driving problems.

Topics to be discussed:

- Legal description
- Physical characteristics
- Danger zones

WHAT IS A SCHOOL BUS?

Not all buses on the road are school buses. It is important to understand the legal description of a school bus because there are a number of state laws which govern school bus equipment and operation.

- **Sec. 257.1807, Section 7.**
    - "School bus" means a motor vehicle with a manufacturer's rated seating capacity of 11 or more passengers, including the driver, used for the transportation of preprimary or secondary school pupils to or from school or school related events.
    - "School bus" includes the multifunction school activity bus manufactured after September 2, 2003 as defined in 49 CRF 571.3, CFR 571.108, and 49 CFR 571.131.
    - "School bus" does <u>not</u> include a vehicle operated by a public transit agency or authority.
- **Sec. 275.1810 (2)**
    - A vehicle, other than a school bus, with a manufacturer's rated seating capacity of 11 or more passengers, including the driver, shall not be used to transport pupils to or from school or school-related events. This subsection does not apply to motor buses that are described in section 10a.
- **49 CFR 301.01**
    - The Motor Vehicles Safety Act prohibits the sale to any school of a motor vehicle which is used to transport students to or from school or any school related activity unless that vehicle meets stringent federal school bus safety standards.
        - 15-passenger vans, as manufactured by major automakers, do not meet these standards. Also, removing the seats from a 10+ passenger van to achieve a 10 passenger maximum will not comply with the law as it is based on the vehicle's rated capacity as established by the manufacturer.
        - Federally inspected small passenger vans may be used for student transportation. ***<u>Remember</u>:*** School buses are always the safest mode of transportation.

- **Sec. 257.1833**.

1. A school bus shall be painted as follows:

   a. The body, cowl, hood, and fenders shall be national school bus chrome yellow.
   b. The bumper, body trim, wheels, and lettering shall be black. The wheel rims shall be gray, black, white, or natural, as provided by the manufacturer.
   c. The wheel covers, if painted, shall be black.
   d. The grill, if not chrome, shall be national school bus chrome yellow.
   e. The mirrors, if painted, shall be black or yellow.
   f. The name of the school district shall be permanently affixed in black letters that are at least 6 inches high on the sides of the bus. The name of the school district or contractor shall be permanently affixed on the front, back, and sides of the bus in black letters.
   g. The words “school bus” shall be permanently affixed on the front and back of the bus between the overhead flashers in black letters that are at least 8 inches in height.
   h. The outside of a school bus shall not have any other lettering, symbol, marking, or advertising, except that animal pictures, cartoon figures, and similar insignia may be affixed to the bus in a temporary manner near the entrance door, but not closer than the second window, to assist in identifying the bus route. A unique identification number may be permanently affixed on the upper corners of the back, front, or sides of the bus. A contractor shall display a USDOT number when required and in the manner required by 49 CFR parts 390 to 399.
   i. Wording for school bus roof and door emergency exits, for inside and outside the bus, shall comply with the motor vehicle safety standards found in 49 CFR 571.217.
   j. The roof of a school bus may be white or yellow. However, no part of a school bus may be white below the drip rail above the side windows.

1. Except for a bus leased seasonally to transport agricultural workers to and from a field for agricultural operations, a bus, other than a school bus shall not be painted, in whole or in part, in the colors and design specified in subsection (1).

2. Subsection (1) does not apply to multifunction school activity buses.

Multifunction School Activity Bus

49 CFR 571.3

Multifunction school activity bus (MFSAB) means a school bus whose purposes do not include transporting students to and from home or performing school bus stops.

Commercial Motor Vehicle Definition

- **Sec. 257.7a**. "Commercial motor vehicle" means a motor vehicle designed to transport 16 or more passengers, including the driver; a motor vehicle, having a gross vehicle weight rating of 26,001 or more pounds, a motor vehicle with a gross combination weight rating of 26,001 pounds or more including a towed unit with a gross vehicle weight rating of more than 10,000 pounds; or a motor vehicle carrying hazardous material and on which is required to be posted a placard as defined and required under 49 C.F.R. parts 100 to 199. A commercial motor vehicle does not include a vehicle used exclusively to transport personal possessions or family members for non-business purposes.

School Bus Driver's License Endorsements

- **Sec. 257.1849.**

2. A person shall not operate a school bus unless that person possesses a valid chauffeur's license, the appropriate vehicle group designation, a passenger vehicle endorsement, and a school bus endorsement as required under section 312e of the Michigan vehicle code P.A. 300, MCL 257.312e.

BUS CONFIGURATION

Buses Come in Many Sizes

- There are several varieties of school buses meeting the legal definition which drivers may be expected to drive. There are two basic body types – the conventional and the transit. Buses also vary in size from the 89 passenger, to the smaller 16 passenger.

- Buses vary in engine placement. The engine can be in the front, rear, or middle of the bus. Buses also vary in the kind of fuel they burn. Fuels can be gasoline, diesel, bio-diesel, natural gas, or propane.

- School buses have several physical characteristics which can cause a number of problems. A school bus is much longer, wider, higher, and heavier than an automobile, all of which increase the potential for accident producing situations.

- Drivers must be aware of these characteristics and take extra precautions to avoid the associated problems.

- A conventional 65 passenger school bus is approximately 35 feet long. Buses can be as long as 45 feet.

    - The length of the bus will affect merging with other traffic and changing lanes. A longer gap in traffic is necessary to complete these maneuvers.

    - The length of the bus causes problems in knowing when to begin turning the steering wheel for right turns. The rear wheels serve as the pivot point and, if the steering wheel is turned too soon, the rear wheels will go over the curb. If turned too late, the bus will not remain in the correct lane.

    - More attention must be paid to avoid bumps and holes in the pavement. Pupils sitting in the rear of the bus are more severely jolted than the driver when the rear wheels ride over these highway defects.

- Drivers should avoid backing up, but on occasion backing up will be necessary. The length of the bus makes it extremely difficult to see and judge distances to the rear. There is an approximate 10 foot overhang behind the rear wheels on the bus.

- Pupils sometimes like to play tricks on the driver. If a few pupils sit in the back of the bus and start bouncing up and down, they will cause a bouncing motion of the bus which may cause steering loss.

- When turning right on a narrow two-lane street the rear of the bus may swing out into the adjoining lane.

- When backing into a parking stall the rear of the bus will extend 10 feet beyond the curb before the rear wheels hit the curb. Any tree, pole or post near the curb could easily be struck before you realize the rear of the bus is beyond the curb.

- A school bus can be approximately 8 ½ feet wide. When the west coast mirrors are considered, buses are nearly 10 ½ feet wide. The width of the bus does not leave much maneuvering room within a lane. Lanes vary in width from 9 feet on some narrow city streets to 12 feet on the interstate system. Drivers must be aware of traffic next to their vehicle in adjacent lanes and fixtures near the edge of the road which may be struck by the protruding mirrors.

- There is another trick pupils can play on the driver that relates to the width of the bus. If pupils sitting on both sides of the bus begin swaying from side to side in a coordinated fashion they can cause the bus to sway. This further reduces the limited maneuvering room that the bus has in its lane.

- A school bus is 9 to 11 feet high. The height of the bus is of concern when going under overpasses and canopies. Height clearances are generally posted on the bridge or canopy. Close attention should be paid to them. Related to the height of the school bus, is the high center of gravity of the bus. The bus floor is 3 feet or more above the ground. This high center of gravity makes the vehicle unstable and prone to tip over.

- When the bus is fully loaded, the center of gravity is even higher because the bus seats are 1 ½ feet above the floor. This additional weight high in the bus makes the bus even more prone to tip over. Standees further increase the problem.

- Bus bumpers and skirting are approximately 18 to 26 inches high. Low bumpers and skirting, along with the long rear overhang, causes problems when going up or down short, steep grades such as driveways. This is especially likely to occur when the bus is loaded. Low bumpers and skirting, along with the low undercarriage of the bus, can also cause a problem when backing into a parking area. As the rear overhang extends beyond the curb it could scrape objects hidden in the grass.

- The bottom step is approximately 14 inches from the ground. The height of the step makes it very difficult for young children to climb. There is always the danger that in the process of lifting their legs so high, and in trying to pull themselves up, they might slip and slide under the bus.

- An unloaded conventional or transit school bus weighs 6 to 10 tons. When loaded this weight increases to 10 to 14 tons. Total load weight includes the weight of the bus, the number and weight of the passengers and any equipment, luggage or baggage that is carried.

- Weight of the bus is of concern when crossing bridges. Axle weights are generally posted on the bridges. A bridge should never be crossed if the axle weight of the bus exceeds the weight restriction.

- Weight affects acceleration and stopping ability. It takes longer to increase speed in a school bus than it does in an automobile. This is important to remember in any situation requiring acceleration such as starting from a stop or during such maneuvers as merging or passing.

SCHOOL BUS MEASUREMENTS AND WEIGHTS

Characteristics	School Bus Vehicle Type	
	Conventional	**Transit**
Length	33-45 feet	35-45 feet
Height	9-11 feet	9-11 feet
Weight		
• Unloaded	6 tons (12,000 lbs.)	7 tons (14,000 lbs.)
• Loaded	10 tons (20,000 lbs.)	12 tons (24,000 lbs.)
Axel		
• Unloaded	3.5 tons (7,000 lbs.)	5 tons (10,000 lbs.)
• Loaded	5 tons (10,000 lbs.)	7 tons (14,000 lbs.)
Width		
• Legal	8 ½ feet (102 inches)	8 ½ feet (102 inches)
• Operational	10-12 ½ feet	10-12 ½ feet
Capacity	11-78	48-90
Wheelbase	20-22 feet	22-24 feet

Bus/Car Comparisons

The heavier the vehicle the longer it takes to stop. Buses cannot stop as fast as automobiles so it is important to begin stopping sooner.

- A school bus:

  - Has a longer stopping distance
  - More blind spots
  - Different turning radius
  - Must stop at railroad crossings
  - Is more visible
  - Driver should avoid backing up unless absolutely necessary
  - Driver has more distractions to contend with while driving
  - Driver usually drives the same route at the same time each day
  - Driver must pre-trip vehicle (also recommended for cars, but rarely done)
  - Driver has the ability to control traffic
  - Driver has to work with parent/school/students

INVESTIGATING BLIND SPOTS

Blind Spots/Danger Zones

- There are a number of locations ahead, behind and to the sides of school buses that are particularly dangerous because they are hidden from the driver's direct view. Drivers must be aware of these locations and know how to adjust and use their mirrors so they can avoid any dangers within these blind spots.

- One danger zone is immediately in front of the bus. The blind spot in front of the vehicle extends much further in a conventional vehicle than in a transit vehicle, because in a conventional vehicle the hood is so high and sticks out several feet in front of the driver. In both types of vehicles, however, there is a blind spot immediately in front of the vehicle.

- How far the blind spot extends in either type of vehicle will vary depending upon the eye level of the driver when sitting in the driver's seat. The lower the eye level, the longer the blind spot. Any object below the driver's viewing angle cannot be directly seen by the driver.

- A second danger zone is directly behind the vehicle. The intent of the inside mirror is to have it adjusted so the driver can observe the passengers; not traffic directly behind the vehicle. Therefore, there is a blind spot directly behind the vehicle that cannot be seen with either outside mirror.

- A third danger zone is on the driver's side of the vehicle. The blind spot on the driver's side of the vehicle is created by the fact that the driver cannot see directly below the window level. How far the blind spot extends will also vary depending upon the eye level of the driver when sitting in the driver's seat. Any object below this angle cannot be seen directly by the driver.

- The final danger zone is on the passenger side of the vehicle. This blind spot is also created by the fact that the driver cannot see directly below the window level. The blind spot on the passenger side, however, will extend further to the side of the vehicle than on the driver's side of the vehicle because the driver is sitting further away from the window.

    - The greatest danger area on this side of the vehicle is directly in front of the front and rear wheels where pupils may be struck by the vehicle.

    - How far the blind spot extends will also vary depending upon the eye level of the driver when sitting in the driver's seat. Any object below this angle cannot be directly seen by the driver.

MICHIGAN MIRROR LAW

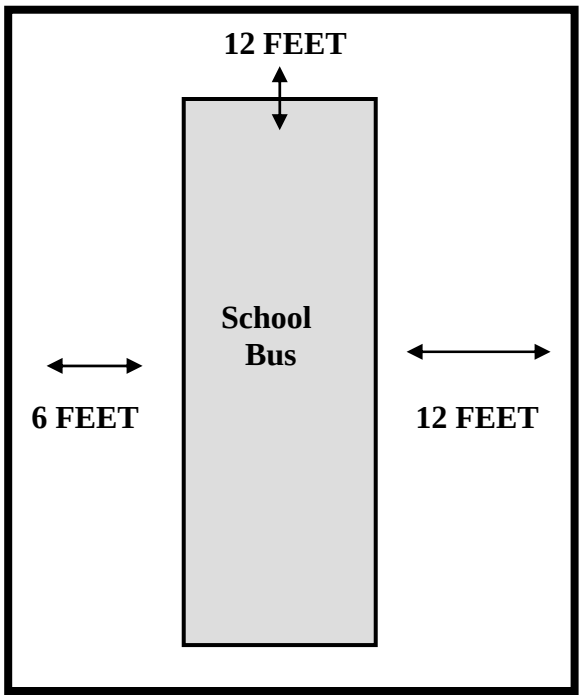
Michigan law regarding mirror requirements is consistent with the Federal mirror requirements.

- **Sec. 257.1823 (Amended August 15, 2006)**

    A school bus shall be equipped in a manner that the driver, in a normal seated position, either by direct vision or by use of an indirect vision mirror system, shall be able to observe objects on the roadway in front of and beside the vehicle located inside a continuously visible rectangular area. The school bus shall comply with the visibility and equipment requirements of 49 CFR 571.111.

FEDERAL MIRROR LAW

- **Federal Motor Vehicle Safety Standards (FMVSS) 49 CFR 571.111.**
  - Apply to all school buses
  - Require that drivers be capable of viewing, either by directly or indirectly, critical areas around the bus through system A (rearview) and system B (crossview) mirrors
  - Requires that mirrors meet image clarity standards
  - Require that mirrors be installed with stable supports
  - Require testing by final stage manufacturer
  - Require that mirror test cylinders be a specific size



GUIDELINES FOR MIRROR ADJUSTMENTS

Remember: unless your mirrors are checked and properly adjusted each time you drive a school bus, you cannot see the students or the traffic around you.

- **Using the front crossover mirrors you should be able to see:**
  All the way across the front bumper of the school bus plus not less than 2 feet on either side from the ground to the point where direct observation is possible and not less than 12 feet in front of the school bus.

- **Using the right convex mirror you should be able to see:**
  1. The right front tires making contact with the ground
  2. The entrance door area
  3. Along the side of the rear of the school bus

- **Using the left convex mirror you should be able to see:**
  1. The left front tires making contact with the ground

2. Along the side to the rear of the school bus to reduce the left side blind spot

- **Using the side flat mirrors (west coast) you should be able to see:**
  1. The side of the bus in the edge of the mirror but not enough to enable you to count the windows
  2. Parallel to sides of the bus at least on traffic lane
  3. The ground within approximately 6 inches of the rear dual wheel
  4. Approximately four (4) bus lengths behind the bus

  Remember: Your side flat mirrors (west coast) when adjusted and properly used will give you a wider viewing area, but, they also create blind spots that can hide a vehicle as large as a semi-truck. When approaching an intersection, be cautious and lean towards the steering wheel to peer around the mirrors to see if traffic has cleared.

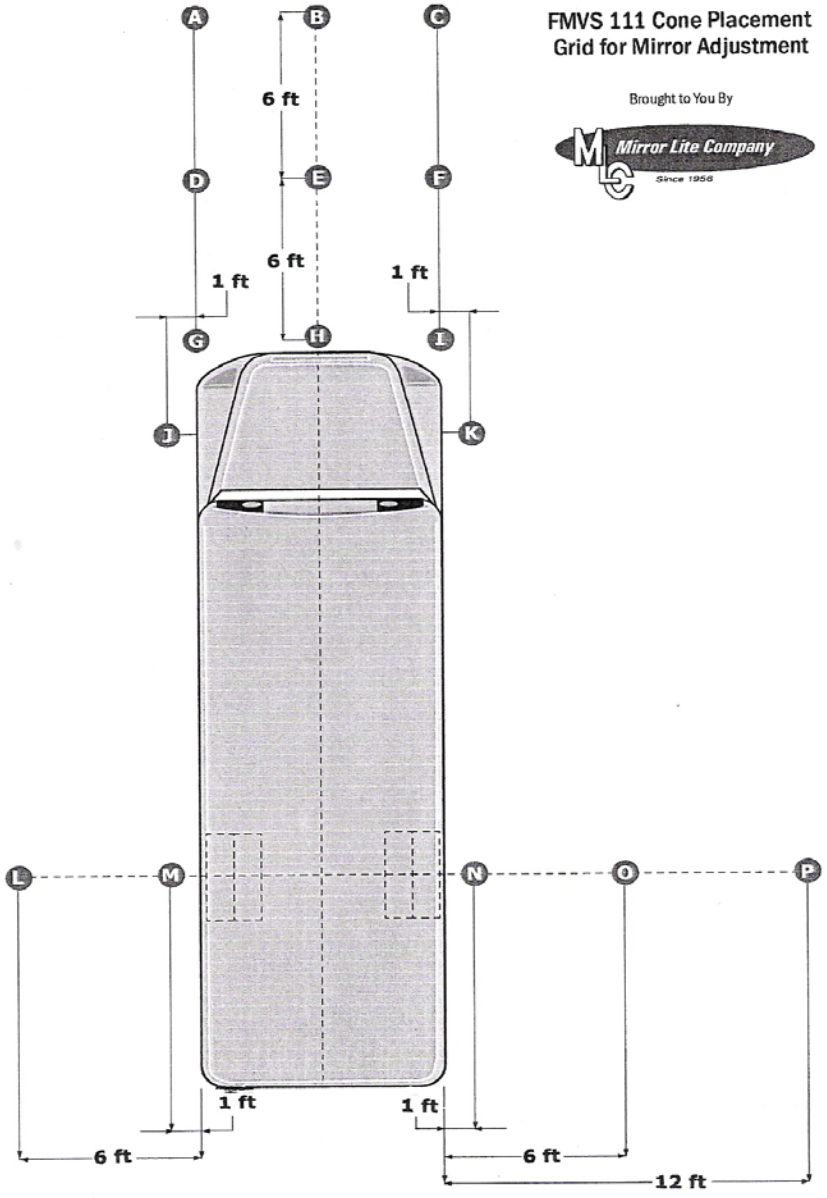
- **Inside Rear View Mirror**
  The rear view mirror should be adjusted to see the students inside the bus and any traffic directly behind the bus. If you cannot adjust the mirrors to your satisfaction, you may need to ask your supervisor and/or mechanic for bracket adjustment.

Mirror Adjustment

The mirrors on the school bus are among the most essential pieces of safety equipment. However, they are only as good as you allow them to be. As a school bus driver, it is your responsibility to be aware of what is going on around you; with
proper adjustments and usage of the mirrors this is possible. Nonetheless, any object located beyond your personal driver's angle in your mirrors and beyond your field of vision cannot be seen unless you turn your head and look.

Knowing the physical limitations of the bus and knowing how to respond or compensate for these limitations is crucial to safe driving. Drivers should learn as much as they can about their bus so they can avoid many of the hazards of driving school bus.

SCHOOL BUS MIRROR STANDARD
Mirror Station



School Bus Vehicle Measurements

It is important that you understand the vehicle characteristics and size of your school bus. Your instructor may have you do a laboratory unit that will require the actual measuring of the school bus. Forms for this activity are provided at the end of this section. If there is not time for the measuring unit, you may wish to perform the measurement on the bus you drive back at your own district.

O.L. Overall Length	**W.H.** Window Height	**L.W.** Legal Width
W.B. Wheel Base	**H.H.** Hood Height	**O.W.** Operational Width
O.H. Overhang (rear)	**V.H.F.** Vehicle Height Front	
G.C. Ground Clearance	**V.H.R.** Vehicle Height Rear	

WHAT WILL THE LABORATORY RESULTS REVEAL?

As your designated group performs the bus measuring assignments, formulate the reason(s) for their importance to each school bus driver.

For instance,

- Why is it important to know the distance from the rear duals to the rear bumper?
- Why is it important to understand how much higher off the ground passengers sit in school buses versus regular automobiles?
- What other considerations must be made regarding overall vehicle height?
- Why is knowledge of the wheelbase length of our school bus so important?
- What are a few examples that pertain to the necessity of knowing the vehicle width including mirrors?
- Why is it so important to know the clearance from the bottom step to the pavement?

Measuring Stations # 1 and # 2

1 Vehicle Familiarization & Inspection

Optional Laboratory Work Sheet

Directions: Working in a group, you and your laboratory partners are to complete each task listed below. Completion of a task will include answering a series of questions, collecting and reporting information about a school bus and practicing vehicle inspection techniques. It is important that group members work together to complete all tasks. Remember, you have a limited amount of time.

Task: Vehicle Familiarization

BUS FAMILIARIZATION WORKSHEET

1. How long is the bus, from front bumper to rear bumper? _____
2. How long is the bus from the rear bumper to the back of the rear duals? _____
3. How long is this bus from the hub of the rear dual to the hub of the front wheel? _____
4. What is the width of this school bus? _____
5. What is the height from the ground to the floor at the emergency door? _____
6. Measure the distance from the top of the hood to the ground in front of the bus? _____
7. What is the height from the ground to the first step? _____
8. What is the distance from the ground to the bottom of the side body panel? _____
9. What is the distance from the ground to the bottom of the side window line? _____

10. What is the distance from the bottom of the window to the floor *inside* the bus? _____

11. Subtract #10 from #9 _____

12. Sitting in the drivers seat, looking out over the hood, without the use of the mirrors, how many plates can you see? _____

2 VIEW FROM DRIVER'S COMPARTMENT

Measure what a driver can see with the unaided eye, as well as using the plain and convex mirrors while positioned in the driver's seat. It is suggested that one group member sit in the driver's seat while the rest of the group take measurements of what the driver sees. The driver may use the horn to signal his/her group outside the bus.

1. One group member with his/her back against the bus' radiator will walk forward until the driver can see the top of a member's head and then until the driver can see the group member's feet touch the pavement. Measure the distance at each point.
   - Top of head: _____ ft. _____ in.
   - Feet touch the ground: _____ ft. _____in.

2. Using only the <u>right side view plain mirror</u>, measure how wide an area the driver can see away from the right rear dual, midway between the rear dual, at the entrance door, and 3 feet to the rear of the entrance door.
   - Distance from the rear dual: _____ ft. _____ in.
   - Distance from side of bus: _____ ft. _____ in.
   - Distance from entrance door: _____ ft. _____ in.

3. Using the <u>right side convex (crossover) mirror</u>, measure how wide an area the driver can see away from the right rear dual, midway between the rear dual, at the entrance door, and 3 feet to the rear of the entrance door.
   - Distance from the rear dual: _____ ft. _____ in.
   - Distance from side of bus: _____ ft. _____ in.
   - Distance from entrance door: _____ ft. _____ in.

4. Take the same measurement as in number 2, but this time on the <u>left side</u> of the bus.
   - Distance from the rear dual: _____ ft. _____ in.

- Distance from side of bus: _____ ft. _____ in.
- Distance from drivers' window: _____ ft. _____ in.

5. Take the same measurement as in number 3, but this time use the left side convex (crossover) mirror.
   - Distance from the rear dual: _____ ft. _____ in.
   - Distance from side of bus: _____ ft. _____ in.
   - Distance from drivers' window: _____ ft. _____ in.

6. Have a group member stand directly behind the right or left rear directional signal and walk in a straight line away from the rear of the bus. Looking in the inside rear view mirror only, the driver will sound the horn as a signal to stop when he/she sees the group member from the waist to the head. Measure the distance from the back of the bus to the group member: _____ ft. _____ in.